Weeding out the tumor-forming cells from potential stem cell therapies

Posted: August 15, 2011

Created: 15/08/2011 - 10:53

CIRM grantees at Stanford University have removed some of the risk of therapies based on human embryonic stem cells or reprogrammed adult cells, known as iPS cells.

Both of these cells types are known as pluripotent, which means that the cells can go on to form all the mature cells of the human body. The problem is that those cells also form tumors called teratomas. In the process of developing new therapies, scientists first prod the stem cells into a more mature cell type, such as a neural progenitor for spinal cord injury, an insulin-producing pancreatic cell for diabetes or retinal cell for forms of blindness. Then, they go through a laborious process to show that no tumor-forming cells still remain in that batch of cells that they hope to use in therapies.

The new technique, published August 14 in *Nature Biotechnology*, provides a novel way of identifying cells that are potentially tumorigenic and removing them from a batch of cells. Krista Conger at Stanford wrote about this paper:

"The ability to do regenerative medicine requires the complete removal of tumor-forming cells from any culture that began with pluripotent cells," said Irving Weissman, MD, director of the Stanford Institute for Stem Cell Biology and Regenerative Medicine. "We've used a combination of antibodies to weed out the few undifferentiated cells that could be left in the 10 or 100 million differentiated cells that make up a therapeutic dose."

Weissman pointed out that the production of therapeutic cells from pluripotent stem cells for regenerative medicine was a major goal of Proposition 71, the ballot measure that established the California Institute for Regenerative Medicine to allocate $3 billion to advance stem cell science. CIRM funded this research.

â¦

"Commonly used differentiation protocols for embryonic stem and iPS cells often give rise to mixed cultures of cells," said research associate Micha Drukker, PhD. "Because even a single undifferentiated cell harbors the ability to become a teratoma, we sought to develop a way to remove these cells before transplantation."
If other research groups repeat these findings, the technique could reduce some of the risk of therapies based on pluripotent cells.

Nature Biotechnology, August 14, 2011

A.A.

Tags: Stanford University, Weissman